

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE August 99		3. REPORT TYPE AND DATES COVERED Final Report: 20 Apr 98 thru 20 Feb 99
4. TITLE AND SUBTITLE Microelectronic Status Analysis and Secondary Part Procureability Assessment of the AMCOM Weapon System			5. FUNDING NUMBERS	
6. AUTHOR(S) Gary A. Maddux				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Univ. of Alabama in Huntsville Huntsville, AL 35899			8. PERFORMING ORGANIZATION REPORT NUMBER 5-20139 & 5-20140	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) AMSAM-RD-SE-IO (D. FREY) U.S. Army Aviation & Missile Command Redstone Arsenal, AL 35898			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for Public Release; Distribution is unlimited.			12b. DISTRIBUTION CODE A	
13. ABSTRACT (Maximum 200 words) The Industrial Operations Division (IOD), SEPD, RDEC, AMCOM has the mission and function of providing microelectronic technology assessments, and producibility and supportability analyses for AMCOM weapon systems. IOD required engineering support in performing microelectronic technology and availability assessments for several hundred items and in assessing the impact of nonavailability on AMCOM weapon systems. IOD also required engineering support in performing producibility analyses as well as spare and repair part obsolescence management during the Tech Loop review cycle. To facilitate the assessment of these systems, UAH was tasked to conduct an in-depth analysis as to the obsolescence of the AMCOM weapon system's component parts.				
14. SUBJECT TERMS microelectronic obsolescence			15. NUMBER OF PAGES 3	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT	

19991004 035

PLEASE CHECK THE APPROPRIATE BLOCK BELOW

DAO# _____

☐ _____ copies are being forwarded. Indicate whether Statement A, B, C, D, E, F, or X applies.

☒ DISTRIBUTION STATEMENT A:
APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED

☐ DISTRIBUTION STATEMENT B:
DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES
ONLY; (indicate Reason and Date). OTHER REQUESTS FOR THIS
DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT C:
DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND
THEIR CONTRACTS (Indicate Reason and Date). OTHER REQUESTS
FOR THIS DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT D:
DISTRIBUTION AUTHORIZED TO DoD AND U.S. DoD CONTRACTORS
ONLY; (Indicate Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO
(Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT E:
DISTRIBUTION AUTHORIZED TO DoD COMPONENTS ONLY; (Indicate
Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT F:
FUTHER DISSEMINATION ONLY AS DIRECTED BY (Indicate Controlling DoD Office
and Date) or HIGHER DoD AUTHORITY.

☐ DISTRIBUTION STATEMENT X:
DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES
AND PRIVATE INDIVIDUALS OR ENTERPRISES ELIGIBLE TO OBTAIN EXPORT-CONTROLLED
TECHNICAL DATA IN ACCORDANCE WITH DoD DIRECTIVE 5230.25. WITHHOLDING OF
UNCLASSIFIED TECHNICAL DATA FROM PUBLIC DISCLOSURE, 6 Nov 1984 (indicate date of
determination). CONTROLLING DoD OFFICE IS (Indicate Controlling DoD Office).

☐ This document was previously forwarded to DTIC on _____ (date) and the
AD number is _____.

☐ In accordance with provisions of DoD instructions. The document requested is not supplied because:

☐ It will be published at a later date. (Enter approximate date, if known).

☐ Other. (Give Reason)

DoD Directive 5230.24, "Distribution Statements on Technical Documents," 18 Mar 87, contains seven distribution statements, as described briefly above. Technical Documents must be assigned distribution statements.

GARY A. MADDUX

Print or Type Name

Gary A Maddux 21 Aug 99
Authorized Signature/Date

256 890 6343 x 223

Telephone Number

Technical Report 5-20139 & 5-20140
Contract No. DAAH01-98-D-R001
Delivery Order No. 3

**Microelectronic Status Analysis and Secondary Part Procureability
Assessment of the AMCOM Weapon System**

(5-20139 & 5-20140)

Final Technical Report for Period
20 April 1998 through 20 February 1999

August 1999

Prepared by:

Gary A. Maddux

Systems Management & Production Lab
The University of Alabama in Huntsville
Huntsville, Alabama 35899

Prepared for:

U.S. Army Aviation & Missile Command
Redstone Arsenal, AL 35898
Attn.: Mr. Dan Frey

PREFACE

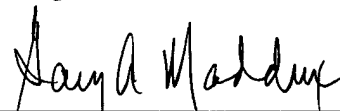
This technical report was prepared by the staff of the Research Institute, The University of Alabama in Huntsville. The purpose of this report is to provide documentation of the work performed and results obtained under Delivery Order 3 of AMCOM Contract No. DAAH01-98-D-R001. Mr. Gary Maddux was the principal investigator. Mr. Bruce Chandler served as lead analyst. Mr. Dan Frey, Industrial Operations Division, Systems Engineering and Production Directorate, Research, Development, and Engineering Center, U.S. Army Aviation & Missile Command, provided technical coordination.

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other official documentation.

Except as provided by the Contract Data Requirements List DD Form 1423, hereof, the distribution of any contract report in any state of development or completion is prohibited without the approval of the Contracting Officer.

Prepared for: Commander
U.S. Army Aviation & Missile Command
Redstone Arsenal, AL 35898

I have reviewed this report, dated August 1999 and the report contains no classified information.



Principal Investigator

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	OBJECTIVES	1
3.0	STATEMENT OF WORK	1
4.0	ASSESSMENT OF AMCOM WEAPON SYSTEMS	3
5.0	CONCLUSIONS AND RECOMMENDATIONS	3

1.0 Introduction

The Industrial Operations Division (IOD), SEPD, RDEC, AMCOM has the mission and function of providing microelectronic technology assessments, and producibility and supportability analyses for AMCOM weapon systems. IOD evaluates the impacts of nonavailability of microelectronic parts on the life cycle supportability of AMCOM weapon systems and evaluates the producibility of AMCOM weapon systems. IOD required engineering support in performing microelectronic technology and availability assessments for several hundred items and in assessing the impact of nonavailability on AMCOM weapon systems. IOD also required engineering support in performing producibility analyses as well as spare and repair part obsolescence management during the Tech Loop review cycle of AMCOM weapon systems.

In order to facilitate the assessment of these system, the Systems Management and Production Laboratory at The University of Alabama in Huntsville Research Institute was tasked to conduct an in-depth analysis as to the life cycle health of the AMCOM weapon systems' component parts.

2.0 Objective

The purpose of the work performed under this task order was to provide engineering support to analyze the availability of microelectronics used in AMCOM weapon systems spare and repair parts and to investigate and determine known solutions for those problem parts.

3.0 Statement of Work

The statement of work, as outlined in delivery order 3, was as follows:

3.1 UAH shall analyze the availability of microelectronic parts used in AMCOM weapon systems. The analyses shall be for microelectronics specifically identified by the IOD. UAH shall also identify known solutions. The analyses shall be performed using government furnished databases and automated tools such the Enhanced Microcircuit Obsolescence Analysis Tool (E-MOAT) local area network and with the TACTech information service. Other available sources of information shall be used as required. Analyses results shall be recorded in databases which shall be compatible with current government databases and delivered in digital and written report format to the government. Results also shall be presented and documented in a final report. All results shall be delivered to the government.

3.1.1 UAH shall define microelectronic component obsolescence assessment methods. UAH shall analyze current government obsolescence assessment methods. Additional approaches shall be developed as required. Analysis methods, data

sources, criteria and reporting formats shall be documented within all written reports.

- 3.1.2 UAH shall research and analyze AMCOM weapon systems microelectronic component availability data. Commercial and government databases shall be searched for data on microelectronic obsolescence and availability. Approved alternate sources, part numbers and qualified substitutes for obsolete or unavailable parts shall be identified. Compliance with military and commercial standards shall be verified.
- 3.1.3 UAH shall assess AMCOM weapon systems readiness, producibility, and supportability impacts resulting from microelectronic obsolescence. Specific component availability and obsolescence problems affecting AMCOM weapon systems shall be identified. Quantitative statistics to demonstrate the impacts at the system, line replaceable unit (LRU), circuit board and component levels shall be derived as directed. Potential approaches to resolve availability and obsolescence problems and reduction of their impacts on system supportability shall be proposed as necessary.
- 3.1.4 UAH shall purchase the CAPS information service for a 1-year subscription. The CAPS information service shall be located at the IOD facility at Redstone Arsenal. The subscriptions shall follow the current subscription.
- 3.2 UAH shall analyze the producibility of AMCOM weapon systems and subsystems. The analyses shall be performed on parts specifically identified by the government. UAH shall analyze TDP data (listings, engineering documentation and changes thereto) to advise the government if the present baseline and/or detail drawings are adequate for competitive procurement and/or manufacture. UAH shall, during TDP analysis, document any cost reduction opportunities in the TDP, using value engineering methodology as a generally accepted practice of cost analysis. UAH shall provide a written report for each TDP analyzed. The report shall detail any deficiencies and provide recommended solutions. UAH shall provide recommended TDP updates where applicable.
- 3.3 UAH shall perform an engineering analysis on producibility problems identified during the procurement cycle of AMCOM weapon systems secondary items. The analysis shall require review of drawings, specifications, and related materials. Results of the analysis shall be prepared and furnished in a written report.
- 3.4 UAH shall provide engineering support for the development of Very High Speed Integrated Circuit (VHSIC) Hardware Description Language (VHDL) modeling for selected AMCOM weapon systems microcircuits as well as support other performance related acquisition efforts.

4.0 Assessment of the AMCOM System

Under this task members of the UAH Systems Management and Production Lab performed a detailed engineering analysis on the component parts of the AMCOM weapon systems. Specifically, microelectronic components were analyzed according to their availability and expected life cycle. To ascertain this information, UAH worked with the electronics industry, the AMCOM project offices, and other government agencies.

The results of this task were published and delivered to IOD under separate cover.

5.0 Conclusion and Recommendations

During the time frame allocated by the delivery order, members of the UAH Systems Management and Production Lab, with the cooperation of representatives from AMCOM Systems Engineering and Production Directorate and the AMCOM project offices investigated the life cycle supportability of the microelectronics of the AMCOM weapon systems. Because of the rapidly changing microelectronics industry, it is imperative that this assessment be refreshed on a periodic basis. Only through the diligent monitoring of a complex system can its sustainability issues be properly addressed. It is recommended that the AMCOM project offices adopt a proactive obsolescence management philosophy so that the total cost of ownership is reduced over the system's life cycle.